



DEPARTMENT OF THE ARMY
CAMP STANLEY STORAGE ACTIVITY, MCAPP
25800 RALPH FAIR ROAD, BOERNE, TX 78015-4800

December 21, 2006

U-021-07

Mr. Bryan Smith
Texas Commission on Environmental Quality
Industrial and Hazardous Waste Permits Section
P.O. Box 13087 (MC-130)
Austin, TX 78711-3087

Subject: Quarterly Status Report of the Pilot Study Class V Aquifer
Remediation Substrate Injection Well Activities at Camp
Stanley Storage Activity, Boerne, Texas, TCEQ Authorization
No. 5X2600408 WWC11140446/ CN602728206/RN104431655

Dear Mr. Smith:

The Camp Stanley Storage Activity (CSSA), McAlester Army Ammunition Plant, U.S. Army Field Support Command, Army Materiel Command, U.S. Army, is submitting this quarterly report summarizes the injection activities performed at the on-post Solid Waste Management Unit (SWMU) B-3 site. This report summarizes activities that were conducted between August 1 and October 31, 2006, under the above-referenced Class V UIC Inventory Authorization application.

A pilot study is being performed at the SWMU B-3 site to evaluate the effectiveness of enhanced anaerobic biodegradation (EAB) for treatment of chlorinated compounds in groundwater. The pilot study well location map is shown on Figure 1. The pilot study included the injection of a conservative tracer to evaluate groundwater flow conditions followed by the injection of an organic substrate mixture for the EAB evaluation. Both the tracer and substrate mixtures were injected into monitoring well CS-B3-MW01 under the approved SWMU B-3 UIC Class V Inventory Authorization Form.

Between March 15 and April 8, 2006 Parsons completed the injections for the EAB pilot study. In March 2006, 5 gallons of a conservative tracer consisting of a mixture of potassium iodide and water was injected into monitoring well CS-B-3-MW01 and samples were collected from downgradient monitoring points. In April 2006, an organic substrate mixture was injected into monitoring well CS-B3-MW01. The substrate mixture was comprised of 100 gallons of sodium lactate, 170 gallons of vegetable oil emulsion, and 2,900 gallons of VOC-impacted groundwater. Following injection of the organic substrate, groundwater monitoring was initiated to assess the geochemical changes occurring in the aquifer. No additional injections were conducted at the site and no future injections are currently planned.

During the past quarter, groundwater monitoring was conducted in August and October, 2006. Groundwater samples were previously collected during May and June, 2006. Samples were collected from the injection well (CS-B3-MW01) and downgradient monitoring points CS-WB05-LGR-03B, CS-WB05-LGR-04A, CS-WB05-LGR-04B, CS-WB05-BS01, CS-WB05-

CC01, CSOWB05-CC02, CS-MW16-LGR, and CS-MW16-CC. The groundwater samples were analyzed for volatile organics, methane, ethane, ethene, carbon dioxide, manganese, nitrate/nitrite, ferrous iron, alkalinity, total organic carbon, chloride, bromide, sulfate/sulfite, and volatile fatty acids (acetic acid, butyric acid, etc.).

Review of the monitoring results performed during the quarter indicates that the groundwater is continuing to become more anaerobic as a result of the increase in microbial activity degrading the organic substrate material. Contaminant concentrations have declined and geochemical indicators such as dissolved oxygen and oxygen reduction potential indicate that the groundwater geochemistry is becoming more anaerobic. Concentrations of byproducts such as methane and carbon dioxide have increased due to the breakdown of the organic material. Concentrations of manganese, nitrate, and sulfate have decreased whereas nitrite, ferrous iron, chloride, and bromide have increased due to oxidation/reduction reactions associated with microbial activity within the aquifer. Additionally, the concentrations of volatile fatty acids have increased which can also be attributed to an increase in microbial activity. The post-injection sample results for August and October 2006 are summarized in Table 1 along with pre-injection results collected in January 2006 for comparison.

CSSA plans to continue the SWMU B-3 pilot study by continuing the groundwater monitoring to assess the progression of anaerobic biodegradation processes. At this time, CSSA does not plan to perform additional injections at this site. Since no further injections are planned at this time, CSSA requests suspending the quarterly reporting required under the UIC Inventory Authorization indefinitely. If future injections are performed, the TCEQ will be notified in advance and the quarterly status reports will be prepared to summarize those injections and associated monitoring results.

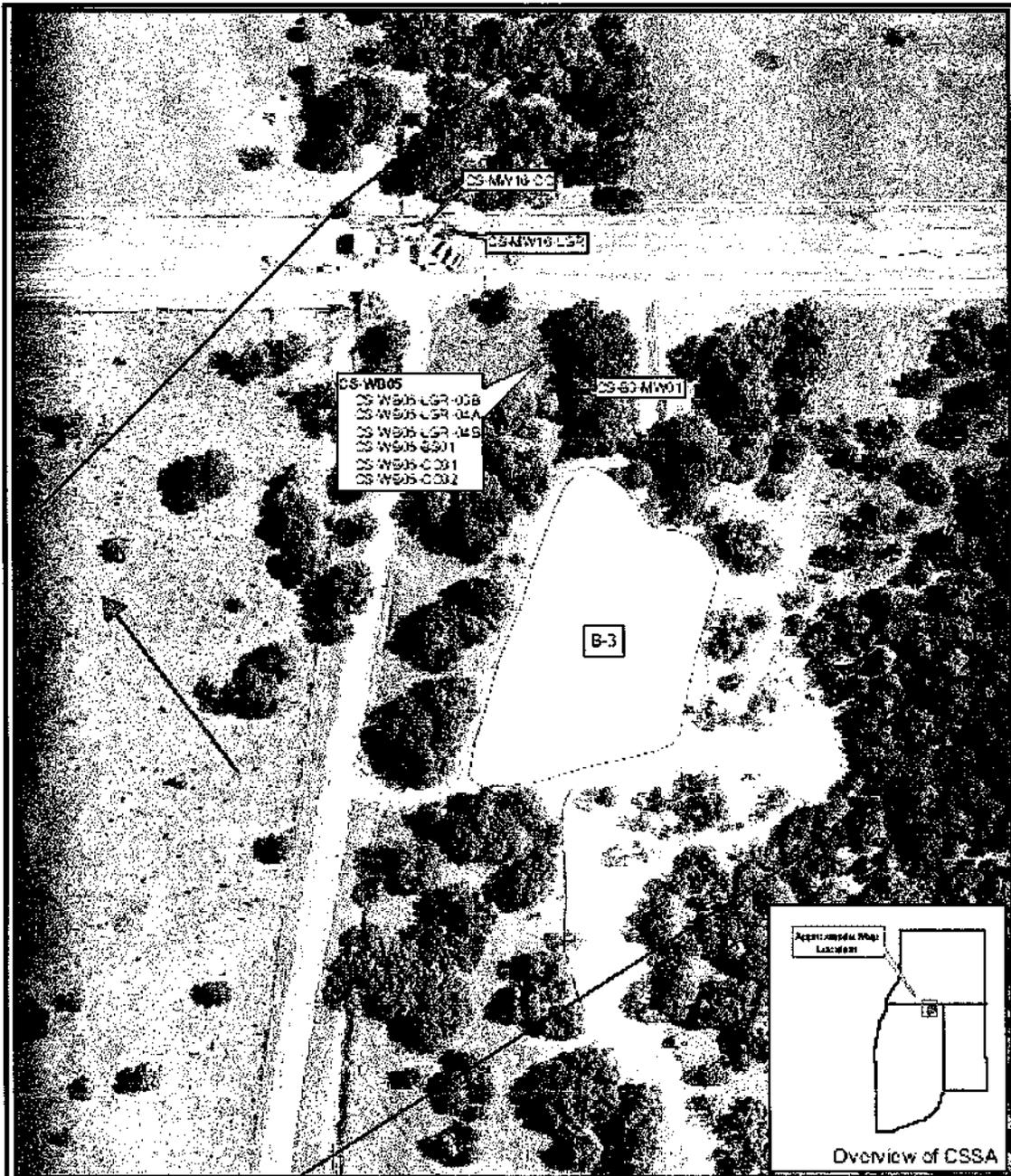
If you have any questions regarding the information contained in this letter, please feel free to contact Glare Sanchez, CSSA Environmental Program Manager, at (210) 698-5208 or Gary Cobb, Parsons, at (512) 719-6011.

Sincerely,

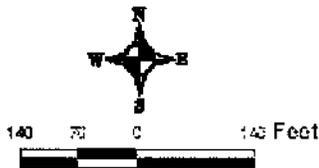

Jason D. Shirley
Installation Manager

Attachments

cc: Glare Sanchez, CSSA Environmental Program Manager
Julie Burdey, Parsons
Brian Vanderglas, Parsons
File: 744223.06000



Aerial Photo Date: 2003



- Groundwater Flow Direction
- Faults (USGS)
- Checkered (Dashed where intermittent)
- Monitoring Well Locations
- ERM Boundary

Figure: 1
 Pilot Study Well
 Location Map
 Camp Stanley Storage Activity
PARSONS

Table 1
Summary of Groundwater Monitoring Results
SWMU B-3 Enhanced Anaerobic Biodegradation Pilot Study
Camp Stanley Storage Activity, Texas

Well	PCE (µg/L)					TCE (µg/L)					cisDCE (µg/L)					transDCE (µg/L)					Vinyl Chloride (µg/L)				
	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06
CS-B3-MW01	15.0	4.73	nd	nd	0.811 F	30.7	10.1	1.46	nd	0.639 F	57.8	16.9	48.1	49.7	31.8	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
WB05-LGR-03B	45.3	31.6	nd	nd	nd	78.3	46.6	48.1	76.9	60.7	69.6	54.4	39.2	41.2	31.9	nd	nd	nd	1.51	0.847 F	nd	nd	nd	nd	nd
WB05-LGR-04A	22.5	nd	15.2	nd	0.449 F	54.6	16.5	28.4	27.5	39.9	111	17.6	37	25.5	29.4	nd	nd	1.01	nd	0.294 F	nd	nd	nd	nd	nd
WB05-LGR-04B	586	239	417	296	160	562	280	491	324	201	624	355	506	329	272	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
WB05-BS-1	87.7	--	--	17.8	59.8	84.0	--	--	20.3	67.2	95.8	--	--	30.5	61.1	1.61 F	--	--	nd	nd	nd	--	--	nd	nd
WB05-CC-01	130	--	--	263	226	152	--	--	200	172	201	--	--	203	162	3.52 F	--	--	3.54	nd	nd	--	--	nd	nd
WB05-CC-02	214	--	--	188	167	269	--	--	203	220	350	--	--	275	236	4.79 F	--	--	1.71 F	nd	nd	--	--	nd	nd
CS-MW16-LGR	47.3	--	--	--	64.3	48.0	--	--	--	63.7	46.9	--	--	--	56.5	1.36 F	--	--	--	nd	nd	--	--	--	nd
CS-MW16-CC	4.45 F	--	--	2.34	nd	28.0	--	--	55.6	59.3	67.6	--	--	78.9	96.8	12.1	--	--	16.4	12.3	nd	--	--	0.828 F	nd

Well	Ethane (µg/L)					Ethene (µg/L)					Methane (µg/L)					DO					ORP (mV)				
	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06
CS-B3-MW01	nd	4.76	nd	nd	nd	nd	3.55	nd	nd	nd	1.14 F	4.64	505	8510	11000	5.53	3.31	2.86	3.07	3.69	157.5	-126.9	-21.9	-70.5	-126.1
WB05-LGR-03B	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	41.7	6.98	29.4	7.65	5.10	3.95	5.78	6.43	153.6	26.9	-25.0	-40.9	-131.4
WB05-LGR-04A	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.38 F	2.67	3.5	58.6	35.5	7.51	4.09	3.85	4.47	5.75	-39.9	-79.6	-97.5	-119.6	-95.4
WB05-LGR-04B	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	1.34 F	8.26	6.45	6.68	9.71	8.72	166.4	129.0	52.9	60.9	31.2	
WB05-BS-1	nd	--	--	nd	nd	nd	--	--	nd	nd	2.52	--	--	2.18	256	7.80	--	--	8.30	8.23	69.4	--	--	-34.1	-66.7
WB05-CC-01	nd	--	--	nd	nd	nd	--	--	nd	nd	2.82	--	--	11.2	39.5	9.89	--	--	8.73	8.05	47.8	--	--	-63.1	-111.5
WB05-CC-02	nd	--	--	nd	nd	nd	--	--	nd	nd	10.5	--	--	118	168	8.54	--	--	8.99	10.24	60.4	--	--	-60.7	-87.5
CS-MW16-LGR	nd	--	--	--	nd	nd	--	--	--	nd	2.78	--	--	--	38	8.30	--	--	--	5.31	192.3	--	--	--	-32.1
CS-MW16-CC	nd	--	--	nd	nd	1.75	--	--	nd	nd	35.8	--	--	1430	77.2	7.70	--	--	3.30	4.91	143.1	--	--	-204.7	-159

Well	Nitrate					Nitrite					Mn					Ferrous Iron					TOC				
	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06
CS-B3-MW01	0.336	nd	nd	155	nd	nd	0.218	0.039	0.041	0.053	nd	0.384	0.971	0.690	0.435	0.04	8.52	12.5	12.3	2.35	4.6	609	773	807	472
WB05-LGR-03B	0.016	nd	nd	nd	nd	nd	nd	0.003F	nd	nd	0.8	0.00401F	0.005F	0.00347 F	0.00495 F	0.01	0.048F	0.33	nd	0.398	1.7	nd	1.4	0.88 F	0.88 F
WB05-LGR-04A	nd	nd	nd	nd	nd	nd	nd	0.003F	nd	0.004 F	nd	0.00687F	0.89F	0.00677 F	0.00629 F	0.1	0.224	0.047F	nd	0.25	3.4	nd	1.2	2.1	2.1
WB05-LGR-04B	0.697	0.723	1.11	1.08	0.991	nd	0.003F	0.002F	nd	nd	0.1	0.00154F	nd	0.00072 F	0.00634 F	nd	nd	nd	nd	nd	1.2	0.64F	0.67F	2.6	nd
WB05-BS-1	nd	--	--	nd	0.007 F	nd	--	--	nd	nd	0.2	--	--	0.00316 F	0.00194 F	nd	--	--	nd	nd	0.51 F	--	--	1.7	nd
WB05-CC-01	nd	--	--	nd	0.004 F	nd	--	--	nd	nd	0.4	--	--	0.00334 F	0.00717 F	0.05	--	--	nd	0.525	nd	--	--	0.73 F	nd
WB05-CC-02	0.006 F	--	--	nd	0.004 F	nd	--	--	nd	nd	0.3	--	--	0.003 F	0.0074 F	0.1	--	--	0.493	0.536	2.1	--	--	1.4	nd
CS-MW16-LGR	0.014	--	--	--	0.921	nd	--	--	--	nd	nd	--	--	--	0.0175	0.13	--	--	--	0.148	0.43 F	--	--	--	nd
CS-MW16-CC	nd	--	--	nd	nd	nd	--	--	nd	0.003 F	nd	--	--	0.0211	0.0101 F	0.7	--	--	0.282	0.889	5.00	--	--	2.4	nd

Well	Chloride					Bromide					Sulfate					Sulfide					CO ₂				
	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06
CS-B3-MW01	24.1	24.5	26.2	19.0	17.3	0.240	30.9	30.4	36.7	35.5	141	1.24	nd	0.23	0.36	0.02	0.010F	0.424	0.224	0.06	52.5	570	570	627	282
WB05-LGR-03B	14.8	13.3	11.8	12.9	13.0	0.190 F	0.120F	nd	0.100 F	nd	61.8	69.7	34.7	72.5	70.4	0.01	0.008F	0.531	0.018 F	0.09	134	312	290	339	99.5
WB05-LGR-04A	15.9	11.8	12.4	12.1	11.5	0.180 F	0.110F	nd	0.080 F	nd	38.8	35.7	65.2	33.4	31.5	0.06	nd	0.043	0.168	0.259	182	285	325	336	24.6
WB05-LGR-04B	16.9	12.6	12.5	12.3	12.3	0.190 F	0.120F	nd	0.070 F	nd	15.1	15.2	14.6	15.1	15.1	nd	nd	nd	0.006 F	0.006 F	170	288	201	295	229
WB05-BS-1	17.0	--	--	13.4	12.9	0.180 F	--	--	0.060 F	nd	40.5	--	--	36.0	36.5	0.01	--	--	0.015 F	0.018 F	2.0	--	--	303	62
WB05-CC-01	19.3	--	--	17.1	16.6	0.220	--	--	0.110 F	nd	47.1	--	--	58.2	56.4	nd	--	--	0.016 F	0.017 F	176	--	--	266	60.4
WB05-CC-02	20.4	--	--	17.4	17.7	0.210	--	--	0.110 F	0.130 F	57.2	--	--	73.7	78.2	nd	--	--	nd	0.008 F	156	--	--	271	74.3
CS-MW16-LGR	17.3	--	--	--	12	0.200	--	--	--	nd	23.7	--	--	--	19.9	0.36	--	--	--	0.039	122	--	--	--	69
CS-MW16-CC	19.0	--	--	15.4	15	0.220	--	--	0.080 F	nd	45.2	--	--	24.1	44.1	0.58	--	--	1.02	0.029	83.4	--	--	368	57.5

Well	Alkalinity					Acetic Acid					Butyric Acid					Formic Acid					Lactic Acid				
	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06
CS-B3-MW01	252	779	--	--	1480	nd	360	569.92	194.76	87.64	nd	nd	14.62	30.22	10.17	nd	1.61	nd	nd	0.77	nd	23.5	nd	nd	nd
WB05-LGR-03B	370	280	--	--	322	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
WB05-LGR-04A	408	304	--	--	281	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
WB05-LGR-04B	334	251	--	--	280	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
WB05-BS-1	330	--	--	--	278	nd	--	--	nd	nd	nd	--	--	nd	nd	nd	--	--	nd	nd	nd	--	--	nd	nd
WB05-CC-01	288	--	--	--	273	nd	--	--	nd	nd	nd	--	--	nd	nd	nd	--	--	nd	nd	nd	--	--	nd	nd
WB05-CC-02	308	--	--	--	274	nd	--	--	nd	nd	nd	--	--	nd	nd	nd	--	--	nd	nd	nd	--	--	nd	nd
CS-MW16-LGR	290	--	--	--	260	nd	--	--	--	nd	nd	--	--	--	nd	nd	--	--	--	nd	nd	--	--	--	nd
CS-MW16-CC	322	--	--	--	257	nd	--	--	nd	nd	nd	--	--	nd	nd	nd	--	--	nd	nd	nd	--	--	nd	nd

Well	Propionic Acid					Pyruvic Acid				
	Jan-06	May-06	Jun-06	Aug-06	Oct-06	Jan-06	May-06	Jun-06	Aug-06	Oct-06
CS-B3-MW01	nd	687	961.82	859.34	488.26	nd	nd	nd	nd	nd
WB05-LGR-03B	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
WB05-LGR-04A	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
WB05-LGR-04B	nd	nd	nd	nd	nd	nd	nd	nd	nd	nd
WB05-BS-1	nd	--	--	nd	nd	nd	--	--	nd	nd
WB05-CC-01	nd	--	--	nd	nd	nd	--	--	nd	nd
WB05-CC-02	nd	--	--	nd	nd	nd	--	--	nd	nd
CS-MW16-LGR	nd	--	--	--	nd	nd	--	--	--	nd
CS-MW16-CC	nd	--	--	nd	nd	nd	--	--	nd	nd

Concentrations reported in mg/L unless otherwise noted
 F - Analyte detected but concentration is below QC limits.